

REMARKS

Favorable consideration and allowance of claims 1-4 are respectfully requested in view of the following remarks.

Claims 1-4 were rejected under 35 U.S.C. § 103 as being obvious over previously-cited Ishii et al. (US 2002/0038692) in view of newly-cited Kazumi (US 6,793,768). Applicants respectfully traverse the rejection as set forth below.

Claim 1 is amended as follows:

a portion of the plasma processing apparatus containing the top plate portion and the antenna portion is configured such that a node of a first standing wave formed at the top plate portion and in a space between the top plate portion and the antenna portion is present at a position corresponding to an outer peripheral end of the radial waveguide, thereby strengthening mutual coupling between the first standing wave and a second standing wave formed in the radial waveguide.

The amendments to claim 1 are supported by page 5, lines 8-16, for example.

In contrast to the present application, if the first standing wave and the second standing wave are mutually coupled weakly or not mutually coupled, the second standing wave is liable to vary depending on process conditions such as a pressure in a chamber, a type of gas supplied to the chamber, and supplied electric power. Therefore, plasma density varies significantly. In other words, in the case where mutual coupling between the first standing wave and the second standing wave is weak, and other cases, when the above-described process conditions vary, plasma becomes unstable even if the plasma processing apparatus is designed such that a uniform electric field is always obtained by the

first standing wave. However, in the present application, by strengthening mutual coupling between the first standing wave and the second standing wave, uniform plasma can be maintained without causing plasma to be unstable, even if the process conditions vary, thereby providing an advantage over the prior art.

Applicants submit that the prior art fails to teach or suggest the above-recited feature of claim 1. The Office Action acknowledges that Ishii et al does not disclose a portion of the plasma processing apparatus containing the top plate portion and the antenna portion is configured such that a node of a standing wave formed at the top plate portion and in a space between the top plate portion and the antenna portion is present at a position corresponding to an outer peripheral end of the radial waveguide. *See pages 3-4.* Instead, the Office Action cites Kazumi et al.

Applicants submit that Kazumi et al. also fails to teach or suggest the above-recited feature of amended claim 1. In Kazumi et al, a standing wave is formed inside a ring 13 (FIG. 1), and hence a node of the standing wave moves within a region inside the ring 13. *See, e.g., col. 8, lines 7-14.* Further, this reference does not refer to a node of the standing wave in a region outside the conductive ring 13.

Moreover, Kazumi et al neither discloses nor suggests the feature that a node of the standing wave is present at a position corresponding to an outer peripheral end of the antenna portion. In Kazumi et al, the standing wave

cannot be at an outer peripheral end of the antenna 11, because the standing wave is contained inside of the conductive ring 13, the inner diameter of which is far inside of the outer peripheral end of the antenna 11. *See FIG. 1.*

By contrast, in the present application, a node of the second standing wave is located at the point P1 (FIG. 3), as described on page 9, lines 4-7, for example, of the specification. Mutual coupling between the first standing wave and the second standing wave (S2 and S1) is thereby strengthened, so that the first standing wave predominantly contributes to formation and maintenance of a plasma production region in a chamber. As a result, formation and maintenance of the plasma production region can be controlled by the antenna portion that causes the first standing wave to be formed, and variations in plasma density can be reduced. *See page 9, line 4 – page 10, line 6 of the specification.*

Therefore, amended claim 1 is patentable over Ishii et al in view of Kazumi et al. for at least the foregoing reasons.

Claims 2-4 are patentable due to their dependence from claim 1.

In view of the above remarks, Applicants submit that the application is in condition for allowance and such action is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

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If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #101248.55500US).

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Respectfully submitted,



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